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ABSTRACT

This document, on social, environmental, and economic sustainability, is a resource for teachers, administrators, and curriculum developers. The increasing human population on the earth directs attention to sustainability, which was not a problem until the industrial revolution. This book uses an interdisciplinary approach and provides assistance in integrating sustainability concepts into an existing curriculum. Sections include: (1) "Introduction"; (2) "Purpose of the Document"; (3) "Vision"; (4) "Sustainability and Sustainable Development"; (5) "Education for a Sustainable Future--An Interdisciplinary Framework"; and (6) "Bibliography." (Contains 53 references.) (YDS)

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EDUCATION FOR A SUSTAINABLE FUTURE

A Resource for Curriculum Developers, Teachers, and Administrators

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1. INTRODUCTION

What is Sustainable Development?

Sustainable Development is an approach to daily decisions that integrates probable consequences to the environment, the economy and human health and well-being. It is a way of making decisions that balances the needs of today without sacrificing the ability of future generations to meet their own needs.

Manitoba Conservation, 1999

More than ever before, life in Canada is characterized by a connectedness to the global community. This shift in focus is a result of many factors, including changing political and economic alliances, expanded access to information technologies, and an increasing frequency of natural and human-caused disasters. These and other events have given new meaning to the term "global village," which was coined in the 1960s by Marshall McLuhan.

International trade agreements create access to new commodities and new markets; the Internet allows instant contact, virtually anywhere on the Earth; events that were once distant now have an almost immediate impact upon us. Drought in California and frost in Columbia increase the cost of juice and coffee in our neighbourhood supermarket; nuclear accidents can contaminate the Earth's atmosphere in a matter of days.

It is important to note that the global village is becoming a global megalopolis. In October 1999, the Earth's population exceeded six billion people — double what it was in 1960. Each day we add another quarter million people to our numbers. (Suzuki, p. 43)

Within this global village, Canadians have achieved unprecedented levels of prosperity and opportunity. Access to natural resources, including a clean and abundant water supply, universal health care, and an excellent public education system have resulted in global acknowledgement that Canada is one of the best places in the world to live.

Despite this enviable global status, we are experiencing changes to the Canadian human condition, including increasing levels of cancer, asthma, and auto-immune disorders such as AIDS. An important indicator of a sustainable society is a healthy, well-educated population. Poverty and unemployment rates, however, are also rising, particularly among Canadians with low literacy skills, who also suffer poorer health and are likely to die earlier than those with higher levels of literacy. (Health Canada, 1999)

For the first 40,000 years or so that *Homo sapiens* lived on Earth, populations were small enough and resources abundant enough that attention to sustainability issues was not always necessary. Since the industrial revolution, however, increasing human populations and, accordingly, consumption have escalated our demand for the Earth's resources. As populations continue to grow, even further demand will be placed on those resources — resources that are finite and upon which we depend for sustenance and life. Many of the world's Nobel Prize-winning scientists[1] agree that human beings and the natural world are on a collision course.

[1] See World Scientists' Warning to Humanity, Appendix A

Throughout the 20th Century, many individuals and organizations addressed the issue of sustainability. However, recent events are forcing society to collectively address sustainability: to think about the finite nature of Earth's resources; to understand that the damage we are inflicting on our atmosphere, water, and soil may be irreparable; and to realize that human behaviour needs to change if we are to sustain our quality of life on Earth.

The Manitoba Round Table on Sustainable Development advises us to think globally as we act locally, and recognize the social, ecological, and economic interdependence among provinces and nations.

We must "work cooperatively, within Canada and internationally, to integrate economic, environmental, human health and social factors in decision-making while developing comprehensive and equitable solutions to problems." (Manitoba Round Table on the Environment and the Economy, 1998)

It is important to note that despite the need for attention to sustainability issues, many positive changes have already occurred. Examples of initiatives that have improved our quality of life and the environment include:

What sort of world are we headed toward?...

*Human numbers are growing, forests are shrinking, species are dying, farmland is eroding, fresh water supplies are dwindling, fisheries are collapsing, rivers are constricting, greenhouse gases are accumulating, soot is contaminating the air, and lead is contaminating our blood. It is not too late, however, to change the course of events, to build societies that are both environmentally sustainable and industrial... **It is not too late to build a world where the air is safe to breathe, water is safe to drink, and resources are shared among all the world's people — to build a world, in other words, that most people recognize as the one they hope their children will inherit.** (emphasis added)*

(Roodman, 1999)

- the global eradication of smallpox
- the development of a vaccine for polio and the elimination of polio epidemics
- the development and mass distribution of antibiotics
- human genome research for the identification and treatment of genetic disorders
- the development of information technologies that permit greater communication between people and access to previously isolated regions
- greater sensitivity to and understanding of the equity of women and children, minorities, the disabled, the underprivileged, the economically marginalized, et cetera
- the creation of the United Nations and its agencies, UNESCO and UNICEF, which help countries to work together, solve critical issues, and resolve conflicts
- the spreading of democratic governments and human rights
- increased life expectancies

We have an important role to play with respect to sustainability, and can make significant contributions to an equitable and sustainable quality of life for all. We are responsible for our personal future, for the future of Canada and the world, and we can make a difference. If we act now to make *Education for a Sustainable Future* a reality, future generations will inherit a healthy planet.

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2. PURPOSE OF THE DOCUMENT

Education for a Sustainable Future is intended to assist Manitoba curriculum developers and educators to integrate sustainability concepts into new and existing curricula. It is interdisciplinary in approach, and provides direction for the integration of sustainability knowledge, skills, values, and life practices within the curriculum, the classroom, and the community.

The challenge of *Education for a Sustainable Future* is to enable students to make choices that incorporate the essential principles and values of sustainability. In order to do this, students need to be given opportunities to think and act according to the principles of sustainability. This process will contribute to their development as informed and responsible citizens who demonstrate attitudes and make decisions that reflect concern for the sustainability of this planet.

Imagine a world in which smog-shrouded cities and acid-rain-ravaged forests are only a distant memory. Imagine a world in which human societies cooperate with rather than abuse other cultures, in which the people of Ethiopia, the Amazonian rain forests, and other environmentally threatened areas are no longer driven from their homes. Imagine a world in which a stable human population seeks to preserve and nurture the diversity of both the Earth's biota and its human cultures.

(Kaufman et al., 1996)

3. VISION

The following is the vision for *Education for a Sustainable Future* in the province of Manitoba:

Students will become informed and responsible decision-makers, playing active roles as citizens of Canada and the world, and will contribute to social, environmental, and economic well-being, and an equitable quality of life for all, now and in the future.

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4. SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT

The time will soon be here when my grandchild will long for the cry of a loon, the flash of a salmon, the whisper of spruce needles, or the screech of an eagle. But he will not make friends with any of these creatures and when his heart aches with longing he will curse me. Have I done all to keep the air fresh? Have I cared enough about the water? Have I left the eagle to soar in freedom? Have I done everything I could to earn my grandchild's fondness?
(George, 1989)

Definitions

Sustainability refers to the *conservation*, *protection*, and *regeneration* of resources over an indefinite period of time. Central to sustainability is the idea that today's decisions affect the future of human health and well-being, the environment, and the economy.

Sustainability requires knowledge and understanding of past events as well as the ability to make informed predictions of future events.

From an Aboriginal perspective[2], the concept of sustainability has historical roots and has traditionally guided Aboriginal decision making. Decisions must be sustainable now and in the future, for seven generations to come.

The **aim** of sustainability is to make equitable decisions and to conduct activities so that human health and well-being, the environment, and the economy can be improved and maintained for future generations.

Sustainability is a complex idea. It requires understanding, not just of social, environmental, and economic issues, but of their ongoing interrelationship and interdependence. The process of sustainable decision making involves a critical examination of our priorities, habits, beliefs, and values.

The **challenge** of sustainability is that it must be a collaborative process — citizens need to agree upon a vision as well as an action plan for the future. This requires collective and conscious decision making, and is the heart of *Education for a Sustainable Future*.

> *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*
>
> (World Commission on Environment and Development, 1987)

[2] See Appendix B for a detailed description of Aboriginal perspectives and sustainability. For further information regarding Aboriginal perspectives, please consult the following Manitoba Education and Training support documents available through the Manitoba Text Book Bureau:

- ***Native Studies: Early Years (K-4) A Teacher's Resource Book***
- ***Native Studies: Middle Years, A Teacher's Resource Framework***
- ***Native Studies: Senior Years, A Teacher's Resource Book Framework and A Teacher's Resource Book***

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Sustainable development, as described in the 1991 *State of the Environment Report for Manitoba*, "has rapidly become a watchword for describing efforts to reverse the deterioration of the Earth's life-support systems and ensure that our future is environmentally and economically sustainable." (Manitoba Environment, 1991)

With sustainable development as a guiding precept, one considers simultaneously the positive and negative impacts of any decision on **human health and well-being**, the **environment**, and the **economy**. The purpose of this is to integrate and balance our needs, so that an equitable quality of life for all can be achieved and sustained in the future, for seven generations to come. Figure 1 illustrates this interconnected relationship.

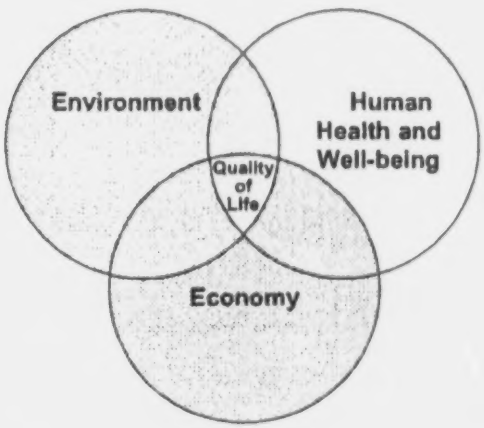

Figure 1: Sustainable Development

Sustainable human health and well-being is characterized by people coexisting harmoniously within local, national, and global communities, and with nature. A sustainable society is one that is physically, psychologically, spiritually, and socially healthy. The well-being of individuals, families, and communities is of prime importance.

A **sustainable environment** is one in which the life-sustaining processes and natural resources of the Earth are conserved and regenerated.

A **sustainable economy** is one that provides equitable access to resources and opportunities. It is characterized by development decisions, policies, and practices that respect cultural realities and differences, and do not exhaust the Earth's resources. A sustainable economy is evident when decisions, policies, and practices are carried out so as to minimize their impact on the Earth's resources and to maximize the regeneration of the natural environment.

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Decisions or changes related to any one of the three components — human health and well-being, the environment, and the economy — have a significant impact on the other two components and, consequently, on our **quality of life**. Decision making must take into account all three components to ensure an equitable, reasonable, and sustainable quality of life for all.

> *Hungry people will not care if their actions endanger an edible species or an important habitat. Unemployment, injustice or insecurity lead to desperation and the need to survive at all costs. To protect an environment for future generations, we have to build a society on a foundation of clean air, water, soil and energy and rich biodiversity to fulfill our biological needs; we have to ensure full employment, justice and security for all communities to serve our social needs; and we have to retain sacred places, a sense of belonging and connectedness with nature and a knowledge that there are cosmic forces beyond our comprehension or control, to satisfy our spiritual requirements.*
>
> (Suzuki, 1999)

Sustainable Development, Social Responsibility, and Equity

Sustainable development supports principles of social responsibility and equity. Williams (1994) believes that the concept of equity is essential to the attainment of sustainability. This includes equity among nations, within nations, between humans and other species, as well as between present and future generations.

Sustainable development is, at the same time, a decision-making process, a way of thinking, a philosophy, and an ethic. An important idea that underlies the decision-making process within a sustainable development approach is the concept of **compromise**. In order to achieve the necessary balance among human health and well-being, the environment, and the economy, some compromises will be necessary.

It is also important to acknowledge the ongoing debate related to sustainable development. Differing perspectives and opinions abound. A brief historical overview of sustainable development, sustainability, and educating for sustainability is provided in Appendix C.

Manitoba's Principles and Fundamental Guidelines of Sustainable Development

The Manitoba Round Table for Sustainable Development was established in 1991 with representation from many sectors of the province, including consumer advocates, business and labour representatives, environmentalists, educators, Aboriginal representatives, and members of the provincial Cabinet.

The Round Table provides leadership, advice, advocacy, and education concerning sustainable development issues in the province.

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Government departments, Crown corporations, health authorities, local governments, school divisions, universities and colleges will be called upon to carry out their activities consistent with the...principles and guidelines of sustainable development.

(Manitoba Round Table for the Environment and the Economy, 1998)

In 1997, the Manitoba Legislature passed *the Sustainable Development Act*[3]. The intention of the Act was to ensure that Manitoba's public and private sectors incorporate sustainable development into day-to-day decision making and overall management and operations.

Manitoba's vision for environmentally sound and sustainable economic growth is governed by a set of principles and guidelines[4] that should be taken into consideration in all decision making. The following questions are based on Manitoba's sustainable development principles. Do we, as citizens of Manitoba,

- endeavour to reduce, reuse, and recover the products of our society?
- enhance the long-term productive capability, quality, and capacity of our natural ecosystems?
- endeavour to restore damaged or degraded environments to beneficial uses?
- research, develop, test, and implement technologies essential to further environmental quality, including human health and economic growth?
- think globally when we act locally, recognizing that there are no boundaries to our environment, and that there is ecological interdependence among provinces and nations?
- work cooperatively within Canada, and internationally, to accelerate the merger of environment and economics in decision making and to develop comprehensive and equitable solutions to problems?
- encourage efficient use of resources and full environmental costing of decisions and developments?
- establish appropriate forums that encourage and provide opportunity for consultation and meaningful participation in decision-making processes by all interested citizens?
- demonstrate awareness of our common physical, social, and economic environment in this province?
- understand and respect differing social and economic views, values, traditions, and aspirations?
- encourage and support the improvement and refinement of our environmental and economic information base, and promote equal and timely access to information to all Manitobans?
- encourage and support decision-making and planning processes that are open, inclusive, efficient, timely, and that consider long-term implications?
- encourage and promote the development and use of substitutes for scarce resources?
- maintain essential ecological processes, biological diversity, and life-support systems of our environment? Do we harvest renewable resources on a sustained yield basis? Do we make wise and efficient use of renewable and non-renewable resources?

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3 See Appendix D: *The Sustainable Development and Consequential Amendments Act*. A copy of the Act is available at Manitoba Statutory Publications, Lower Level, 200 Vaughan Street, Winnipeg, Manitoba R3C 1T5

4 See Appendix E: Manitoba's Principles and Fundamental Guidelines of Sustainable Development

National Perspective

Canadian society is experiencing rapid and fundamental economic, social, and cultural changes that affect the way we live. Canadians are also becoming aware of an increasing global inter-dependence and the need for a sustainable environment, economy, and society.

(Council of Ministers of Education, Canada, 1997)

In September 1999, the Council of Ministers of Education (CMEC) published *Educating for Sustainability: The Status of Sustainable Development Education in Canada*. The report was developed to provide

- a historical review of sustainability and a rationale for educating for sustainability.
- a current and comprehensive view of the progress that has occurred across Canada related to sustainable development education, including a review of education and training policies, guidelines, curricula (K-12 and post-secondary), teacher education, professional development, materials/resources, educational models, educational priorities, and other innovative practices as they relate to educating for sustainability.
- an appropriate context for continuing dialogue and to identify a relevant framework for desired future action.

Did you know...

Recycling

- One metric tonne of recycled newspaper saves about 17 trees.
- Plastics can take up to 400 years to break down in a landfill.
- Plastic bottles collected for recycling are usually made into carpeting, fibre-fill for pillows and sleeping bags, T-shirts, sweaters, automotive parts, and floor tiles.
- It takes 1,000,000 years for a glass bottle to break down in a landfill.
- In Manitoba, most recycled container glass is used as base filler in roads and sidewalks.
- Aluminum takes 500 years to break down.
- Recycling one aluminum can save enough energy to run a television for three hours.

(Manitoba Product Stewardship Corporation and City of Winnipeg Water and Waste Department, 1999)

Energy Conservation

- Individual Canadians account for about 28% of Canada's greenhouse gas emissions — *almost five tonnes per person annually*. Every time we turn on a computer, light, or appliance, drive an automobile, use hot water, or do anything that uses energy, we produce greenhouse gas emissions.
- Every litre of gasoline used in an automobile produces almost 2.5 kilograms of carbon dioxide and other pollutants
- A poorly tuned automobile engine can use up to 50% more fuel and produce up to 50% more emissions than one that is running properly.
- Washing with cold water is 93% more efficient than using hot water.
- Draft-proofing your house can save up to 25% on heating bills.
- One busload of passengers takes 40 vehicles off the road during rush hour, saves 70,000 litres of fuel, and avoids over 175 tonnes of emissions a year.
- Fluorescent light bulbs last 10 times longer than incandescent bulbs and use 25% less energy.
- A furnace that is regularly cleaned and maintained uses 10–15% less energy.

(Government of Canada, 1999)

5. EDUCATION FOR A SUSTAINABLE FUTURE – AN INTERDISCIPLINARY FRAMEWORK

Recognizing the critical role of curriculum in the teaching of sustainability, Manitoba Education and Training has developed an interdisciplinary framework[5] to facilitate the implementation of *Education for a Sustainable Future*. The framework comprises the following components:

a. Rationale

b. Sustainability Knowledge, Skills, Values, and Life Practices
   - Knowledge
   - Values
   - Sustainable Decision-Making Skills
   - Life Practices

c. Sustainability Categories, Concepts, and Linkages

d. Sustainability Topics

e. Facilitating Curricular Connections

> ***We can move faster toward a sustainable world if we understand the principles underlying this concept, and provide humanity with the skills to critically evaluate information, adapt to change, and find creative solutions to intricate problems. A sustainable future will require people who think and act differently than they do today and will necessitate industries and businesses to minimize their own negative impact on the earth's ecosystems. It will therefore require persons with new skills, knowledge, attitudes and values in order to take personal responsibility for sustainable development. Because human beings are the centre of concerns for sustainable development, significant attention must be given to education to improve their capacity to address environment and development issues.***
>
> (IUCN, 1997)

a. Rationale

Education for a Sustainable Future can effect change and provide students with hope. It can instill within students a desire to work for the collective good of the planet, and inspire needed changes in behaviours that will help ensure our survival. If this paradigm shift is to occur, sustainability must become both a Canadian and a global priority.

Fundamental changes in education will be necessary to meet the challenges and opportunities that lie ahead. Promoting the concept of lifelong learning is key to achieving sustainable local, national, and global practices.

---

5 For another example of a framework to teach sustainability concepts, see *Learning for a Sustainable Future: Framework for Curriculum for Education for a Sustainable Future*. Appendix F

How do we protect our environment, meet everyone's basic needs, keep our economy dynamic and maintain a just and healthy society, all at the same time? Sustainable development is about making difficult trade-offs, about weighing all the options, and deciding on a course of action that considers everyone's interests, including our children's and grandchildren's.

(Manitoba Conservation, 1999)

Canadian citizens require new ways of thinking to creatively address and resolve complex social, environmental, and economic issues that affect the quality of life on this planet.

Education can facilitate this change. However, in order to do so, students will require a new set of knowledge, skills, and values; they will also need to demonstrate life practices that reflect an understanding of the interdependence of human health and well-being, the environment, and the economy. Students must be challenged to understand and apply the concepts of sustainability and to envision a sustainable future. They need to know what to aim for in their future, and to understand that *they have the personal power to make a difference and effect change.*

Humans have always understood that all things might not be possible; however, we're beginning to understand that all that is possible may be neither wise nor desirable.

We have reached a point in human history where we have both the technological, social, and ethical capabilities to make a sustainable world a reality, and the obligation to do so. Students must be given an opportunity to understand this reality.

b. Sustainability Knowledge, Skills, Values, and Life Practices

In order for students to make informed decisions and embrace life practices that demonstrate an understanding of and belief in sustainability, they require particular knowledge, skills, values, and life practices. This will enable them to

- commit to a lifestyle consistent with the principles of sustainability.
- take personal responsibility for a sustainable future and work towards an equitable quality of life for all.
- think critically about global issues and take action locally.
- advocate for a strong economy and for government policies that support a strong economy.
- understand the consequences of unequal distributions of power; inequalities in the sharing and distribution of global resources; and the impacts of rampant consumption, consumerism, and built-in obsolescence — and live in such a way as to lessen the impact of these consequences.

The information that follows focuses on sustainability knowledge, skills, values, and life practices.

> ***Educating for Sustainability: Knowledge***
>
> *Students demonstrate knowledge of the dynamic interrelationship among human health and well-being, the environment, and the economy.*

Students require a strong knowledge base in order to understand the complex issues and linkages of sustainability. In short, they require knowledge of human health, the environment, and the economy as well as an understanding of their local, national, and global interdependence.

The source of this knowledge can be found within existing curricula, including science, social studies, mathematics, language arts, dramatic arts, health-physical education, human ecology, and other disciplines.

Figure 2: Understanding Sustainability Issues: Knowledge Linkages

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Educating for Sustainability: Values

Students demonstrate values that reflect the importance of continued balance and harmony among the health and well-being of humans, the environment, and the economy.

Students require a particular set of values in order to make decisions and engage in life practices that reflect sustainability. A student who embodies the values of sustainability

- respects him or herself, values his or her own health, and does not subject him or herself to unnecessary health risks.
- is informed and cares about local, national, and global issues, and cares about the future.
- demonstrates respect for the environment; consumes less; refuses, replaces, reduces, reuses, recycles, restores, and revitalizes.
- advocates for the health of the environment and for government policies that support the environment.
- demonstrates awareness of how his or her actions affect both others and the environment and makes choices to contribute to the common good.
- advocates for a strong economy and for government policies that support a strong economy.
- is willing to share.
- respects, cares for, and works cooperatively with others.
- participates in the community and is involved in community service.
- works cooperatively to identify and address common concerns and opportunities.

The chart that follows illustrates a number of these values.

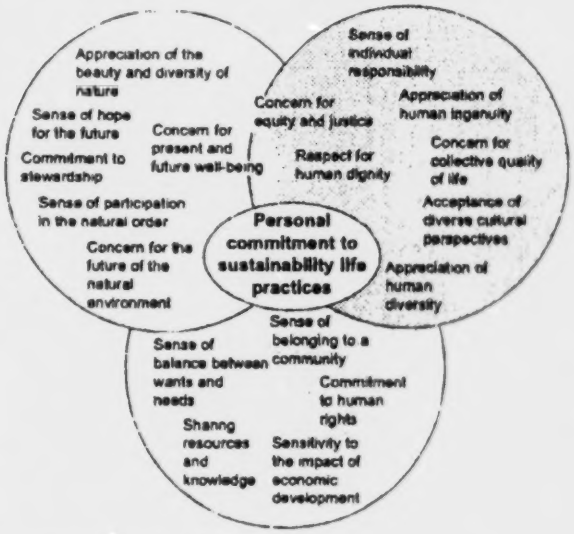
Appreciation of the beauty and diversity of nature
Sense of hope for the future
Commitment to stewardship
Concern for present and future well-being
Sense of participation in the natural order
Concern for the future of the natural environment
Sense of individual responsibility
Concern for equity and justice
Appreciation of human ingenuity
Respect for human dignity
Concern for collective quality of life
Acceptance of diverse cultural perspectives
Appreciation of human diversity
Personal commitment to sustainability life practices
Sense of balance between wants and needs
Sense of belonging to a community
Commitment to human rights
Sharing resources and knowledge
Sensitivity to the impact of economic development

Figure 3: Sustainable Life Practices

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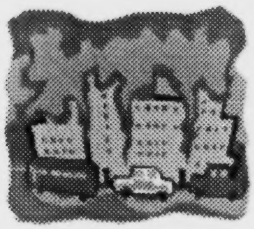
Educating for Sustainability: Sustainable Decision-Making Skills

Students demonstrate the skills necessary to make decisions that balance the needs of human health and well-being, the environment, and the economy.

The students of today are the decision-makers of tomorrow. Although specific issues related to sustainability are likely to change over time, a model for sustainable decision making has longevity and should be able to be applied to new situations.



Students should be encouraged to research sustainability issues, to think critically, and to form and defend their opinions. They need to learn how to find creative solutions for complex problems related to sustainability, and to be aware of the future consequences of their decisions. In doing so, they will develop skills needed to engage in informed and sustainable decision making.

Furthermore, the integration of sustainability concepts within new and existing curricula helps students develop the ability to

- use integrative approaches to learning.
- work cooperatively to identify and address common concerns.
- develop and apply critical thinking skills to complex local, regional, and global issues.
- think creatively, question established ways of doing things, and be self-directed.
- research, access, acquire, and apply knowledge.
- respect diverse positions.
- propose creative solutions to sustainability problems, and contribute to a sustainable future.

Decision making from a sustainability perspective is a complex process. In order to make informed decisions, students require four **foundation skills**[6]:

1. Literacy and Communication

- using language, in all its forms, in learning across subject areas
- reading, writing, listening, speaking, viewing, and other ways of knowing (e.g., role playing, sketching, diagramming, dramatizing) are vehicles and tools for learning across the provincial curriculum

2. Problem Solving

- developing problem-solving applications including
  - — critical and creative thinking
  - — reasoning and logic
  - — learning to learn
- understanding, appreciating, and using abstract patterns, relationships, concepts, and connections with numbers, words, ideas, issues

6 From *Renewing Education: New Directions, A Foundation for Excellence*, Manitoba Education and Training, 1995, p. 61

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3. Human Relations

- developing understanding of, and appreciation for, self
- developing work habits including responsibility, adaptability, entrepreneurship, management of change, accountability
- developing an understanding of, and appreciation for, our society's diverse population
- developing tolerance, teamwork, and leadership
- developing a sense of global interconnectedness

4. Technology

- using technology to learn
- making connections among technology, society, and the environment

In addition to the four foundation skills, there are a number of steps to consider when making decisions from a sustainability perspective.

1. Identify/recognize a sustainability issue or concern.
2. Identify and consult with stakeholders affected by the issue.
3. Research the positive and negative impacts to the health and well-being of people, the environment, and the economy.
4. Propose creative options to solve the problem, address the issue, or to improve or rectify the identified situation.
5. Assess the options as to their positive and negative impacts on the health and well-being of people, the environment, and the economy.
6. Through a process of consensus, decide upon the best course of action.
7. Develop an action plan.
8. Implement the action plan.
9. Evaluate the action plan.
10. Communicate to the stakeholders the results of the actions.
11. Reassess the issue/situation based on evaluation and feedback from stakeholders.

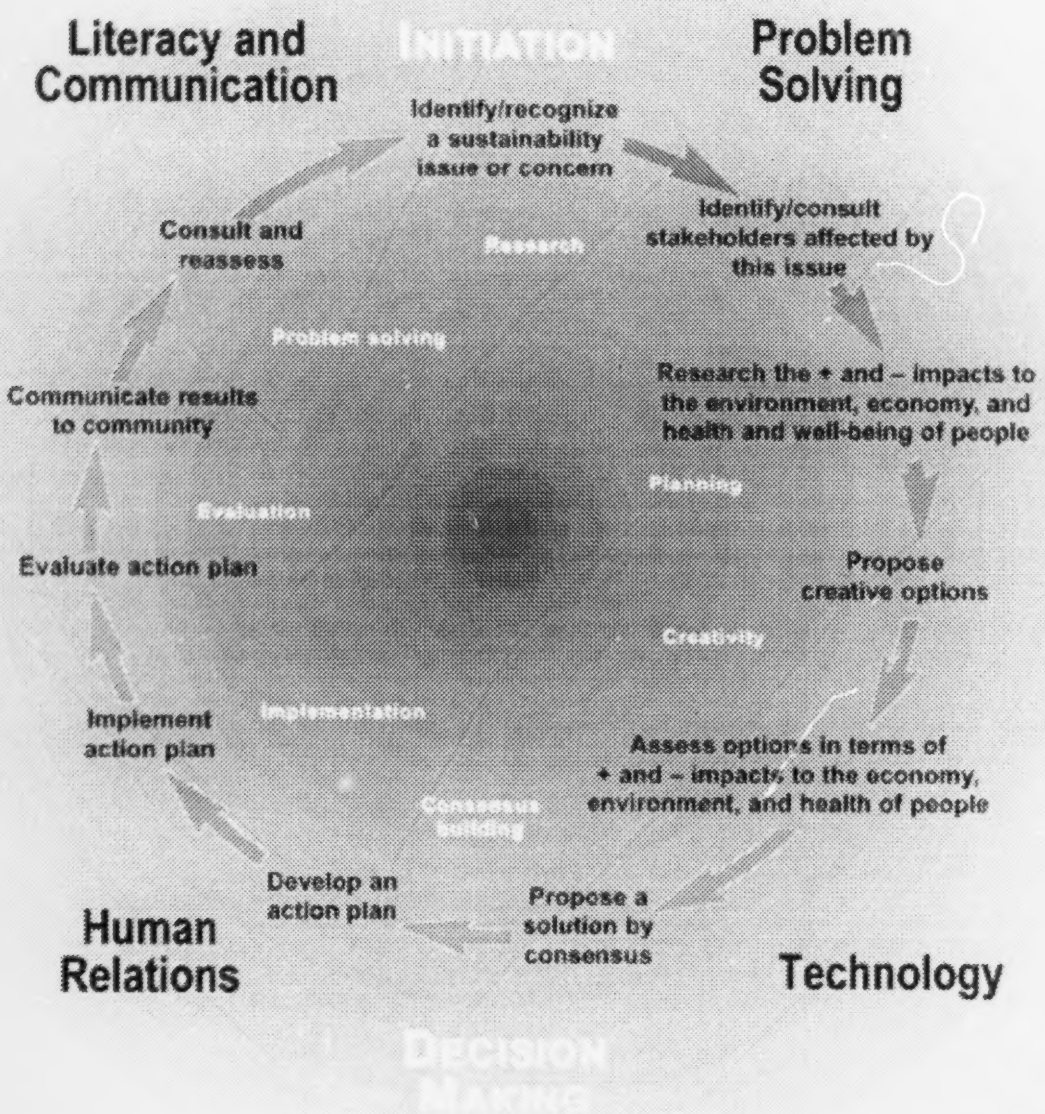
This decision-making model is illustrated on the following page.

Educating for Sustainability: Life Practices

Students demonstrate life practices and choices that balance the needs of human health and well-being, the environment, and the economy.

Once students have acquired knowledge, skills, and values related to sustainability, they will be able to adopt life practices that also embody sustainability. Examples of early, middle, and senior years sustainability life practices are found in the charts following the decision-making model.

Educating for Sustainability: Decision-Making Skills



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Sustainability Life Practices

Activating — Early Years	Acquiring — Middle Years	Applying and Promoting — Senior Years
Human Health and Well-Being	**Human Health and Well-Being**	**Human Health and Well-Being**
1E Demonstrate healthy behaviours — eat and drink wisely (e.g., eating fewer processed foods) — participate in daily physical activity — get proper rest — practise good personal hygiene	*1M Demonstrate healthy behaviours* — make informed and healthy food choices by purchasing and eating healthy food and making appropriately sized lunches — demonstrate awareness of the advantages of physical activity both personally and for society, e.g., participate in daily physical activity to improve health and reduce health care costs — reduce sedentary time, e.g., watching TV, playing video games, etc	*1S Demonstrate healthy behaviours* — choose a healthy diet that makes wise use of resources, e.g., reduce meat consumption and increase grain consumption; purchase in bulk; eat less junk food; increase consumption of fruits and vegetables, organically grown foods, and foods with a high fibre content — make decisions that promote active living, personal safety, and responsible sexual behaviour — participate in outdoor recreation, e.g., canoeing, cycling, hiking — participate in programs that prevent substance abuse, e.g., anti-tobacco and anti-drug use programs
2E Demonstrate safe behaviours — participate in safety awareness programs (fire, water, bike, traffic, etc.) — avoid behaviour that may cause injury	*2M Demonstrate safe behaviours* — demonstrate safety precautions related to weather and the seasons, e.g., stay off of thin ice, cover face and head if outdoors during extreme windchill — practise fire safety and prevention — carry out activities in a safe and responsible manner — encourage others to act in a safe manner — wear appropriate safety gear, e.g., bicycle helmet, safety goggles	*2S Demonstrate safe behaviours* — take safety training courses, e.g., first aid, CPR, boating, snowmobiling, handling farm equipment — use hiking/cycling/snowmobiling paths and show respect for and follow rules related to recreational paths or routes — drive cautiously in wildlife areas — drive within speed limits in a properly tuned vehicle

Sustainability Life Practices (continued)

Activating — Early Years	Acquiring — Middle Years	Applying and Promoting — Senior Years
3E ***Demonstrate care and concern for others at home and at school*** — do volunteer work — make charitable donations, assist with fundraising — contribute to food hampers for the needy — show respect for other people, regardless of gender or culture — care for and treat animals humanely — engage in peaceful conflict resolution — appreciate the diversity that makes each human unique	*3M* ***Demonstrate care and concern for others, locally, nationally, and globally*** — interact empathetically with people of other cultures and with the disabled — contribute to, or volunteer for a worthwhile cause, e.g., a local shelter or soup kitchen — as a class or school, undertake a project to aid others locally, nationally, or globally, e.g., sponsor a foster child in a developing country	*3S* ***Demonstrate care and concern for others, locally, nationally, and globally*** — engender and promote intercultural understanding — be a sustainability role model/mentor to younger children — take a child on a nature hike — participate in school, local, and national government and decision-making processes, e.g., present a petition to the town council asking for the establishment of a teen drop-in centre
The Environment	**The Environment**	**The Environment**
4E ***Demonstrate behaviours that contribute to the well-being of their local environment*** — participate in a recycling program in their classroom — make environmental changes to the classroom or home that enhance physical and mental health, e.g., grow potted plants to improve air quality, install wildlife houses and feeders — dispose of trash in an appropriate manner — stay on paths and don't pick wildflowers in natural areas	*4M* ***Demonstrate behaviours that contribute to the well-being of the environment, at home, school, and in the community*** — establish a recycling program in their school — establish sustainability guidelines for student-council decisions and activities — work in teams and participate in community sustainability projects, e.g., clean up a local riverbank — do not keep exotic pets, which threatens or endangers their existence	*4S* ***Demonstrate behaviours that contribute to the well-being of the environment, locally, nationally, and globally*** — establish a recycling program in their community — take ecology courses offered in school, or request courses be developed if they are not available — respect and follow the laws governing hunting, fishing, and trapping — repair environmental damage to the community and surrounding areas

Sustainability Life Practices (continued)

Activating — Early Years	Acquiring — Middle Years	Applying and Promoting — Senior Years
The Environment (continued) — take part in a variety of activities in the local environment, e.g., visit a local nature centre — reduce personal use of water and energy, e.g., don't leave water running when brushing teeth, turn off lights when leaving a room — appreciate how humans and other living things depend on the environment to meet their needs — show respect for living things	**The Environment (continued)** — participate in the repairing of environmental damage to the school yard and surrounding community — find and use alternatives to herbicides and pesticides in school and family gardens, e.g., pull weeds by hand, use non-chemical slug traps, etc. — engage in activities that reduce or prevent water, air, soil, and noise pollution — practise proper disposal of hazardous waste, e.g., batteries, motor oil, printer cartridges, bleach containers, etc. — explore a stream, river, pond, lake, estuary, or bay through observation and study — get involved in life practices that protect watershed or drainage basins	**The Environment (continued)** — design and implement projects that enhance or protect a natural habitat, e.g., prairie restoration project — participate in community projects to enhance the environment, e.g., shelterbelt planting, shoreline restoration — sow indigenous plants at school and at home — educate others about the importance of a healthy natural environment — work with faculty and administration to implement sustainability policies and practices within the school — participate in school, local, and national government decision-making processes, e.g., take part in local decisions to approve or not approve agricultural or industrial expansion
The Economy *5E Make wise choices about consumption:* — reduce, reuse, and recycle products used in the classroom, school, home, and their school — reduce the amount of garbage produced — use litterless lunch kits	**The Economy** *5M Make wise choices about consumption:* — use a word processor instead of paper — where possible, read online instead of printing hard copies	**The Economy** *5S Make wise choices about consumption:* — organize and establish a recycling program/project at home, school, and in the community — avoid excessive consumerism

Sustainability Life Practices (continued)

Activating — Early Years	Acquiring — Middle Years	Applying and Promoting — Senior Years
The Economy (continued) — avoid wasting food, i.e., take only that which can be eaten, and eat what is taken — make and use a compost in the classroom — use natural and recycled materials for projects — differentiate between needs and wants; don't make unnecessary purchases — use and treat resources (clothing and school supplies such as notebooks, binders, paper, crayons, glue) wisely and judiciously, so as not to be wasteful; e.g., use both sides of paper before recycling, reuse binders year to year, etc.	**The Economy (continued)** — precycle, i.e., refuse, reduce, replace, reuse in order to reduce consumption and recycling — purchase in bulk or concentrated forms — use clotheslines instead of dryers — repair products to extend useful life instead of replacing them — repair worn or torn clothing items instead of purchasing new items — avoid purchasing products made with excessive packaging — avoid buying products made from endangered plants and animals	**The Economy (continued)** — be a responsible consumer by purchasing durable goods of good quality — avoid purchasing disposable or unneeded items, e.g., fad items, non-reusable items, and items purposely designed to become obsolete — demonstrate awareness of the origin of purchased goods and production practices related to the goods they purchase
5E Use energy-efficient practices — turn off lights when not in use — turn off tap water while brushing teeth — take shorter showers — bike or walk instead of asking for rides — dress warmly instead of turning up the heat	*5M Use energy-efficient practices* — investigate alternative energy sources — conduct an energy audit of the school and suggest improvements	*5S Use energy-efficient practices* — evaluate energy efficiency means at home (heat, hot water, and appliances) — make suggestions for improvement, and work with family members to create a more sustainable household — choose energy efficient vehicles — choose a sustainable method of transportation, e.g., walk, bicycle, car pool, and use public transportation — purchase foods and goods grown and produced locally to eliminate energy used for long-distance transport

Sustainability Life Practices (continued)

Activating — Early Years	Acquiring — Middle Years	Applying and Promoting — Senior Years
The Economy (continued)	**The Economy (continued)**	**The Economy (continued)**
6E Understand basic economic principles — become involved in family budget discussions and decisions — save money in a piggy bank or savings account for future activities — engage in trade and barter of goods and services — help sustain the family household, e.g., do regular chores — share personal resources equitably and cooperatively with others	*6M Understand basic economic principles* — help set priorities and contribute to decision making regarding the family budget — create and follow a personal budget — begin to investigate career options — shop and make purchases according to sustainability principles — volunteer to help in home, school, and/or community programs, e.g., community clubs, recreation programs, church, babysitting, etc.	*6S Understand basic economic principles* — take responsibility for the management of personal finances — earn money to support personal needs — make a career and/or post-secondary education plan — advocate for the equitable distribution of resources, locally, nationally, and globally — find substitutes for scarce resources — encourage and/or open and operate an environmentally sustainable business, e.g., environmentally friendly lawn service, snow-shovelling, etc. — volunteer at a local food bank, soup kitchen, homeless shelter, or for community projects such as Habitat for Humanity, community clean-up — appreciate the benefits of industrial development in contributing to our present standard of living
Taking Action	**Taking Action**	**Taking Action**
7E Take action on sustainability issues — communicate the principles of recycling with their families and friends, and pen pals	*7M Take action on sustainability issues* — analyze local and national sustainability issues — use the sustainability decision-making model to explore sustainability issues	*7S Take action on sustainability issues* — investigate sustainability issues — participate in sustainability discussions with peers and decision makers — debate local, national, or global issues by researching and adopting a particular perspective

Sustainability Life Practices (continued)

Activating — Early Years	Acquiring — Middle Years	Applying and Promoting — Senior Years
Taking Action (continued) — participate in Earth Day celebrations, school-planting, "Green School" programs, marathon clubs, "Yellow Fish" painting on storm drains	**Taking Action (continued)** — as a class, identify and discuss a significant sustainability problem/issue — participate in sustainability discussions with their peers — prepare and present a persuasive argument that supports sustainability — send letters and email to people of influence in the surrounding community	**Taking Action (continued)** — reflect on personal beliefs and actions related to sustainability — join a local community group to solve an environmental problem — communicate their views on sustainability issues to local and federal politicians — lobby within their local community for hiking/cycle paths — reduce noise pollution related to volume, e.g., dances, portable stereo volume, industrial noise — analyze local, national, and global issues from a sustainability perspective, including attention to human health and well-being, the environment, the economy, and quality of life

c. Sustainability Categories, Concepts, and Linkages

Education for a Sustainable Future is interdisciplinary in approach, and therefore sustainability concepts need to be integrated into the curriculum in authentic ways — ways that involve cross-curricular themes, units, and projects. This interdisciplinary approach will be greatly complemented by administrative support, collegial networking, and community involvement.

Concepts related to sustainability can be found within Manitoba curricula. In order for *Education for a Sustainable Future* to be successful, those concepts need to be addressed as more than discrete units of knowledge — they need to be explored from a sustainability perspective, using the sustainability decision-making model illustrated earlier. The following charts provide examples of sustainability categories, concepts, and curricular linkages. This information has been condensed from the *Draft Workbook on Provincial Sustainability Indicators*, Manitoba Conservation, January 2000.

Category	*Concept/Issue*	*Sustainability Linkages*		
Basic Services *The basic services category deals with the availability and condition of water, waste, and transportation infrastructure and services.*	• **Infrastructure and Service Delivery**	**Environmental**	**Economic**	**Human Health and Social Well-Being**
		• natural lands and protected areas • forest protection and forest harvest and use • air quality • land use • leachate • methane emissions • energy use • water quality • aggregate mining resource	• mobility	• health and safety • equity • affordable basic necessities • City of Winnipeg companion document for urban-related basic services measures
Employment *The employment category deals with the number of people employed in full- and part-time jobs, and the value of work as measured by time and skill.*	• **Skilled Labour**	• resource extraction • air and water quality • land use	• economic activities • environmental industries • new business starts	• education and training • quality of life (job satisfaction) • migration/ immigration • equitable access to jobs • health and safety • recreational activities

(continued)

Category	*Concept/Issue*	*Sustainability Linkages*		
Biodiversity and Habitat Conservation *The biodiversity and habitat conservation category deals with the variability and health of habitat for wild plants and animals to help conserve biodiversity.*	• **Natural Land and Protected Areas** • **Habitat Loss and Fragmentation**	**Environmental**	**Economic**	**Human Health and Social Well-Being**
		• land use • ecosystem health and integrity • water quality • climate change • wildlife • endangered species • forest health	• land use • fish • forest and wildlife harvest • agriculture • mineral development • energy	• jobs • culture and heritage preservation • traditional rights • spiritual and physical well-being • mobility and access to communities
Wildlife *The wildlife category deals with the health, quantity, and use of wild plant or animal species.*	• **Species Diversity** • **Wildlife Harvest**	• land use • ecosystem health and integrity • water quality • climate change • endangered species • forest health	• fish and forest harvest • agriculture • mineral development • energy	• employment • culture and heritage preservation • traditional rights • spiritual and physical well-being
Water *The water category deals with the quality, quantity, and use of surface and groundwater supplies.*	• **Water Quality** • **Water Quantity, Use, and Allocation** • **Flooding**	• biodiversity • forest conservation • health of wildlife and fish • soil erosion	• agricultural and industrial uses • delivery of basic services • agriculture and business disruption	• availability of potable water supplies • community stability • human health
Air *The air category deals with the quality of air, including cross-border air issues.*	• **Air Quality** • **Global Air Issues**	• damage to plants and animals • change in habitat • soil productivity • climate change • energy consumption	• sick leave paid out • vehicle traffic • change in industry focus to adapt to effects of climate change • energy efficiency • fossil fuel reliance • transportation modes • change in prime agriculture	• human and ecosystem health • quality of life

(continued)

Category	*Concept/Issue*	*Sustainability Linkages*		
Forests *The forest category deals with the quality, quantity, distribution, and use of forests*	• **Conservation and Forest Biodiversity** • **Forest Condition and Use** • **Urban Forests**	**Environmental** • biodiversity • climate change • wildlife habitat • air quality	**Economic** • provincial economy • employment • road access • product diversification • tourism • wood supply	**Human Health and Social Well-Being** • traditional use of forests • non-market goods such as subsistence hunting, berry picking • intrinsic value of forests • recreation • quality of life • education
Fish *The fish category deals with the health, quantity, distribution, and use of fish*	• **Fish Conservation and Biodiversity** • **Quality of Fish for Human Consumption** • **Fish Harvest and Use**	• water quality • fish health • wildlife health and populations • deforestation	• fishery development • subsistence harvest • economic activity	• human health • traditional lifestyles
Land Use *The land use category deals with the uses for land for human activity and settlement, the impacts on other uses, and land use planning and decision-making.*	• **Land Use, Planning, and Decision-Making**	• habitat • biodiversity • protected areas • marginal lands	• economic development • agriculture • infrastructure • effects on tax base	• development within the capital region • community lifestyle choices/quality of life • ease of mobility – adequate public transportation services (road, rail, air)

(continued)

Category	*Concept/Issue*	*Sustainability Linkages*		
		Environmental	**Economic**	**Human Health and Social Well-Being**
Agriculture and Food *The agriculture and food category deals with the economic viability of agriculture, management of land for production, and processing and safety of food.*	• **Economic Viability of Agriculture** • **Safety and Quality of Food** • **Sustainable Agriculture Practices**	• land use • biodiversity • water quality • soil quality • energy use • waste management (landfilling) • climate change • air quality	• economic activity • transportation • value-added economic activity	• human health • animal welfare • equal access to education • community sustainability • demographics (urban migration) • quality of life
Minerals *The minerals category deals with the quantity and use of mineral deposits, and mining activity and its impacts.*	• **Mining Leachate: Production and Storage, and Impact on Soil and Water** • **Mineral Inventory and Potential for Extraction** • **Development of Mining Industry**	• air • water • wildlife • fish • soil quality • land use • protected areas • waste generation	• employment • costs for site rehabilitation • transportation	• recreation (hunting, fishing) • human health
Energy *The energy category deals with current and potential sources of energy, including fossil fuels, hydro, solar, geothermal and wind, and their uses.*	• **Energy Efficiency and Conservation** • **Development of Energy Industry**	• greenhouse gases • air quality • fish • wildlife habitat and populations	• fossil fuel industry • renewable energies industry • registered vehicles and vehicle kilometres driven	• employment • health • quality of life

(continued)

Category	*Concept/Issue*	*Sustainability Linkages*		
Consumption *The consumption category deals with the demand for and use of goods and services, and the waste products resulting from their use*	• **Rate of Consumption**	**Environmental**	**Economic**	**Human Health and Social Well-Being**
		• waste generation • air emissions • land use • water use	• decision making related to economic activity • production efficiency • energy efficiency • international and interprovincial trade movements • transportation and road infrastructure • mobility/ accessibility to goods and services	• environmental/ sustainability education • quality of life • determinants of health (this issue links to all categories) • ease of mobility
Economic Activity *The economic activity category deals with the production of goods, and the provision of services*	• **Comparative Advantage** • **Economic Performance**	• water use • waste management • consumption and emissions due to vehicle kilometres travelled • natural resource depletion • ecological footprint • natural resources stocks • farming of marginal agricultural lands	• diversity of trade products and partners • employment • consumption • basic services (goods hauled) • generation and distribution of wealth • investment • basic services delivery and maintenance • sustainable business • infrastructure spending	• education (skill level) • equity • health • consumption • quality of life
Demographics *The demographics category deals with the composition and dynamics of Manitoba's population*	• **Population Trends**	• stresses on natural resources and land use • water quantity and quality • air quality	• economic activity • employment • education • provision of basic services	• maintenance of culture and heritage • quality of traditional way of life • determinants of health and equity • availability of health care services • crime rate • perceived security

(continued)

Category	*Concept/Issue*	*Sustainability Linkages*		
		Environmental	**Economic**	**Human Health and Social Well-Being**
Education and Training *The education and training category deals with the relevance, quality, affordability and responsiveness of education and training in formal and informal settings*	• **Quality and Relevance of Education and Training** • **Equal Access to and Opportunity for Education** • **Incorporation of Sustainable Development into Teaching**	• environmental awareness • sustainable development and interdependencies awareness • use of natural resources • consumption	• employment • economic activity	• culture • heritage and recreation • quality of life • health • demographics • crime rate • poverty • equitable access to jobs • sense of belonging and value • psychological and physical health • employment • equity • economic activities
Equity and Rights *The equity and rights category deals with social justice and human rights for all, including fairness and equitable living*	• **Human Rights and Social Equity for Individuals, Groups, and Communities** • **Equitable Access for Persons with Disabilities** • **Equitable Access to Job Opportunities**	• waste production • unsanitary conditions	• basic services • equitable access to the labour force	• education • health and safety • crime rate • perceived security • community participation • adequate housing • culture, heritage, and recreation • quality of life
Community and Culture *The community and culture category deals with the opportunity to belong to a community and share its beliefs and culture*	• **Community Participation** • **Economic Viability of Arts and Cultural Enterprises** • **Preservation of Heritage and Culture**	• community environmental organizations • environmental preservation	• economic activities • employment	• health and safety • education • quality of life • preservation of heritage and culture • crime rate • human rights • social equity

(continued)

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Category	*Concept/Issue*	*Sustainability Linkages*		
		Environmental	**Economic**	**Human Health and Social Well-Being**
Governance *The governance category deals with the format, style, and effectiveness of leadership, and the management of the province's affairs, the institutional guarantees for participation in decision making, and the accountability of institutions and officials, both elected and appointed*	• **Opportunity for Participation and Redress** • **Fiscal Management**	• government environmental licensing and land use decision making • biodiversity • natural resources • resources for environmental monitoring and protection	• government subsidies and economic decision making • economic activities • natural resources • industry development • availability of jobs	• government social funding and program delivery • participatory representative democracy • perceived quality of life • equity and rights • Aboriginal and minority issues • participation rates of community organizations, including volunteer work
Health *The health category deals with the mental, physical, spiritual, and social well-being of Manitobans.*	• **Determinants of Health** • **Health Services** • **Individual Health Status**	• air quality • water quality • water/sewage treatment	• employment • economic activity • standard of living	• equity • income distribution • source of income/poverty/ socio-economic status • perceived quality of life • demographics • community participation • literacy rates • education

(continued)

Category	*Concept/Issue*	*Sustainability Linkages*		
Justice *The justice category deals with the security of individuals, and the systems necessary to protect them.*	• **Effectiveness of the Justice System**	**Environmental**	**Economic**	**Human Health and Social Well-Being**
		• air quality • water quality • workplace safety (including indoor air quality) • environmental criminal offences	• economic activity • standard of living • employment • costs related to different methods of dealing with offences • fiscal management • quality of life • basic services	• determinants of health • health status indicators • perceived quality of life • effectiveness of justice system • equitable access to justice, safety, equity, and rights • crime rate • education level • culture and heritage • poverty • health and safety
Perceived Quality of Life *The perceived quality of life category deals with questions related to how people perceive their quality of life, both as individuals and within their communities.*	• **Satisfaction with Life**	• This issue links to all categories, especially quality of life questions throughout.	• This issue links to all categories especially quality of life questions throughout.	• This issue links to all categories, especially quality of life questions throughout.

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d. Sustainability Topics

The chart that follows lists examples of topics that will also be useful in integrating sustainability issues.

Topics for the Integration of Sustainability Issues

access to housing
acid rain
acids and bases
affirmative action
affordable basic necessities
agricultural practices
air emissions and pollution
air quality
alternative energy sources
alternative medicine
animal populations
animal welfare
aquifers
availability of health care services
biodiversity
climate change
community sustainability
community stability
consumption
costs for site rehabilitation
crime rate
culture and heritage preservation
delivery of basic services
demographics
desertification
economic activities
economic development
ecosystem conservation
effects on tax base
employment
endangerment, extirpation, and extinction of species
endangered species
energy efficient housing
energy and energy usage
energy consumption
entrepreneurship
environmental industries
environmental sustainability
equitable access to education, resources, etc.
equitable access to jobs
extinction
food production
forest protection, harvest, and use
forests
gender equality
genetic modification
global inequities
habitat
hazardous wastes
health and safety
health hazards
herbal remedies
impact of technology
indoor air quality
infrastructure
input/output
international agreements
jobs
land use
landfills
leachate
lifestyle choices
literacy
marginal lands
media influences and advertising
methane emissions
migration/immigration
national parks
organic farming
ozone depletion
pay equity
perceived security and safety
population mobility
poverty
product diversification
protected lands and special places
protected areas
psychological and physical well-being
recreation
renewable and non-renewable resources
resource extraction
riverbank restoration
service industries
sharing, distribution, and depletion of natural resources
shelter
soil erosion
soil productivity
spirituality
tourism/eco-tourism
traditional rights
transportation
treaty and land use rights
unsanitary conditions
urban transit
urbanization
use of animal growth hormones
value-added economic activity
waste generation and treatment
waste management
water quality and availability
water quantity, quality, usage
watersheds
wildlife

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We are placed on the Earth (our Mother) to be caretakers of all that is here. Because we are part of Creation, we cannot differentiate or separate ourselves from the rest of the Earth. The way we interact with the Earth, how we utilize the plants, animals and the mineral gifts should be carried out with the seventh generation in mind. We cannot simply think of ourselves and our survival; each generation has a responsibility to ensure the survival of the seventh generation.

(International Institute for Sustainable Development, 1992)

e. Facilitating Curricular Connections

The sustainability concepts and topics presented on the previous page will be useful in the process of integrating sustainability issues, but they are only a starting point.

Curriculum developers, teachers, and administrators will also need to develop strategies to integrate the concepts and topics.

Sustainability knowledge, skills, values, and life practices may be integrated into curricula and/or related learning experiences. Integration can occur as an interdisciplinary approach or within a particular subject area.

i. An Interdisciplinary Approach

Thematic topics can be used as organizers to integrate sustainability through an interdisciplinary approach. This approach can be easily accommodated where one teacher is responsible for several subject areas.

In situations where different teachers are responsible for different subjects, organization and planning will be required to coordinate an interdisciplinary approach. For a detailed description of interdisciplinary education, please consult the Manitoba Education and Training support document, *Curricular Connections: Elements of Integration in the Classroom – A Resource for K-S4 Schools*, available through the Manitoba Text Book Bureau.

The following is an example of an interdisciplinary lesson. The "Mosquito Fogging Dilemma" is an extract from *A Prairie Tour, An Interdisciplinary Middle Years Multimedia Resource for Grade 5 Teachers*. The full document is available at <http://www.edu.gov.mb.ca/metks4/tech/currtech/imym/prairietour>.

Lesson 2.5: The Mosquito Fogging Dilemma

Time: 120 minutes

Overview

In this lesson, students discuss the impact of mosquito fogging in relation to the environment, economy, and well-being of people. They stop to visit a town somewhere between Winnipeg and Brandon, Manitoba. During their stop-over, students become involved in an important town issue. The town council has proposed to start a mosquito fogging program next summer. The town residents are divided in their opinions about this — some strongly support the proposal, others strongly oppose it. Before making a final decision, the council has invited the town residents to present their points of view on the issue. Five have come forward. Students become members of the town council.

They work in teams of four or five to examine the information provided by the five town residents. They identify the points of view presented, record their findings, seek further information arising from their discussions (optional), and propose a group recommendation for the town council.

Prescribed Learning Outcomes

English Language Arts (drawn from Grade 5)

- use personal experiences as a basis for exploring and expressing opinions and understanding (1.1.1)
- seek others' viewpoints to build on personal responses and understanding (1.1.2)
- summarize personal knowledge of a topic in categories to determine information needs (3.1.1)
- formulate general and specific questions to identify information needs (3.1.2)
- share personal knowledge of a selected topic to help formulate relevant questions appropriate to a specific audience and purpose for group inquiry or research (3.1.3)
- acknowledge differing responses to common experiences (5.2.1)

Science (drawn from Grade 5)

- communicate methods, results, conclusions, and new knowledge in a variety of ways (5.0.7g)
- describe positive and negative effects of scientific and technological endeavours (5.0.8g)
- be sensitive to and develop a sense of responsibility for the welfare of other humans, other living things, and the environment (5.0.9e)

Social Studies

- discuss the benefits of being a citizen of the Prairies
- examine own attitudes toward the diverse ways of life on the Prairies

Information Technology Literacy Skills and Competencies (drawn from Skill Development Stage)

- use removable media such as CD-ROMs and cartridges, demonstrating proper handling, insertion, ejection, and accessing of data contained on the media (1.2.5)
- acquire information from network, electronic, and online resources and databases in a variety of formats, such as text, audio, video, and graphics, while limiting extraneous data, and implement appropriate search and selection strategies, including Boolean, keyword, or natural language searches (2.2.1)
- analyze and evaluate information and data obtained from electronic sources by considering their currency, usefulness, and reliability (2.2.2)
- use telecommunications tools, such as e-mail and desktop videoconferencing, for communication and participation in interactive projects with other learners (3.2.3)
- examine projects or reports, created with the use of information technology, for reasonableness or relevance and accuracy (4.2.7)
- recognize the value of privacy and intellectual property rights as they apply to information technology (5.2.5)

- cite sources of information and, where necessary, obtain permission to use the electronic representation of others' work (5.2.6)
- demonstrate responsible behaviour regarding privacy rights, piracy, dissemination of misinformation, and plagiarism when using information technology to complete tasks (5.2.7)

ii. Integration Within Subject Areas

Sustainability concepts can be integrated within any subject area. The following are examples of English language arts and Science learning outcomes that would be suitable for the integration of the concepts of sustainability.

Sample English Language Arts Learning Outcomes

General Learning Outcome 1.1: Discover and Explore
Grade 8: explore diverse ideas to develop opinions, conclusions, and understanding

General Learning Outcome 1.2: Clarify and Extend
Senior 1: structure and restructure ideas and information to extend current understanding and to broaden personal perspectives of the world

General Learning Outcomes 3.1: Plan and Focus
Grade 7: contribute ideas, knowledge, and questions to help establish group inquiry or research focuses and purposes

General Learning Outcome 5.2: Encourage, Support, and Work With Others
Kindergarten: find ways to be helpful to others

Sample Science Learning Outcomes

Curriculum developers can promote sustainability through the development of student learning outcomes within individual subject areas.

The sample science student learning outcomes provided below are taken from the following documents:

- *Kindergarten to Grade 4 Science: Manitoba Curriculum Framework of Outcomes* (1999)
- *Grades 5 to 8 Science: Manitoba Curriculum Framework of Outcomes* (2000)
- *Senior 1 Science: Manitoba Curriculum Framework of Outcomes* (2000)

Students will...

Grade 1 (1-1-13)

Develop, implement, and evaluate personal and group action plans that contribute to a healthy environment for themselves and for other living things.
Examples: wash hands before eating, reduce amount of waste produced by the class...

Grade 2 (2-4-14)

Record personal use of water, and identify ways in which they can reduce water usage.

Examples: rather than leaving water running while brushing teeth, turn off tap to reduce usage...

Grade 3 (3-1-18)

Explain how humans replenish the plants they use and the consequences if plants are not replenished.

Examples: after loggers harvest trees, new ones should be planted to ensure a future lumber supply...

Grade 4 (4-1-14)

Investigate natural and human-caused changes to habitats, and identify resulting effects on plant and animal populations.

Include: endangerment, extinction

Grade 5 (5-1-15)

Explain how human health may be affected by lifestyle choices and natural- and human-caused environmental factors.

Grade 6 (6-3-16)

Identify renewable and non-renewable sources of electrical energy, and discuss advantages and disadvantages of each.

Grade 7 (7-4-10)

Describe methods used to control soil erosion, and recognize the importance of soil conservation.

Examples: economically important to the agri-food industry, important for controlling the flow of water, necessary for plant growth...

Grade 8 (8-4-18)

Identify environmental, social, and economic factors that should be considered in the management of water resources.

Examples: ecosystem preservation, employment, recreation, industrial growth, water quality...

Senior 1 (S1-3-24)

Use the decision-making process to address an issue associated with the generation and transmission of electricity in Manitoba.

Include: hydroelectric power, sustainability

Student Learning Experiences That Promote Sustainability[7]

The following lesson plan illustrates how the sustainable development decision-making process can be utilized in the classroom to help achieve science student learning outcomes.

Toxic Fish

Summary

After reading a text about the water contamination problem affecting a Cree community, the students are invited to find solutions to the problem and to help implement those solutions. Students will need to apply what they have learned in their science class to understand the problem and generate solutions.

Science Specific Learning Outcomes

7-1-03	Identify abiotic and biotic components of ecosystems that allow particular organisms to survive.
7-1-05	Identify and describe positive and negative examples of human interventions that have an impact on ecological succession or the makeup of ecosystems.
7-1-06	Identify environmental, social, and economic factors that should be considered in the management and preservation of ecosystems.
7-1-11	Explain, using ecological pyramids, the potential for bioaccumulation within an ecosystem.
7-0-2a	Access information using a variety of sources.
7-0-7g	Communicate methods, results, conclusions, and new knowledge in a variety of ways.
7-0-7h	Identify and evaluate potential applications of investigation results.
7-0-8g	Discuss societal, environmental, and economic impacts of scientific and technological endeavours.

Steps

Understanding the Problem

Share with students the text provided below: Fish "Seasoned" with Mercury. Based on the text have students:

- clearly define the problem
- identify the social, environmental, health and quality of life implications of the problem
- identify who is affected by the problem

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[7] Adapted from an activity by Lilianne Dionne, published in *Globaliscience: recueil d'activités en éducation dans une perspective mondiale* Association des professeurs de sciences du Québec (APSQ) and the International Development Research Centre (IDRC), Montreal, 1995, p. 22. Reprinted by permission

- determine what information they need to understand the problem and generate solutions (different groups can be assigned different questions):
  - — what is mercury and where is it found?
  - — how do food chains pass on contaminants?
  - — what are the effects of mercury on wildlife and humans?
  - — how did the mercury get into this particular food chain?
  - — what has happened in similar situations in other parts of the world?
  - — how important is fishing to the community?

  This information can be gathered through interviews with elders, scientists, doctors, government officials, as well as through library and internet research.

Finding Solutions

Have students work in groups to propose creative solutions to the problem and assess the options in terms of impacts to the economy, environment, human health, and quality of life. Each group should present and justify their solution to the rest of the class and then the class should discuss the options and reach consensus on the best solution.

Taking Action

Encourage students to identify concrete things they could do to see to it that the solution they propose was implemented (if they were in the situation described). Ideas could include:

- presenting findings to the town or band council
- creating information pamphlets to share with local people to ensure everyone understands the situation (these could be done in Cree)
- organize a town meeting to discuss the issue and share their solution

Reflecting

Have students use their science journals to reflect on the process they used to address this problem and to identify a local/regional issue that they are aware of that could be addressed in the same manner.

Fish "Seasoned" with Mercury

Maurice is 13 years old. He lives with his family in a small native community in north western Quebec. Like all teens in his village, he goes to school. During the school year, he helps his father monitor the family trapping territory. During the summer, he goes on fishing trips with members of his family. He loves these outings, which enable him to have fun while introducing him to the traditional way of life of his people, the Cree.

Last year, some unusual things happened in Maurice's village. It all started when some researchers came to analyze the fish caught in the neighbouring lakes and rivers. Then the government officials came and informed the families of the community that it was dangerous to eat too much fish. In fact, the analysis had revealed the presence of levels of mercury in the flesh of the fish that were much higher than the standard. Maurice learned at school that mercury was a heavy metal that can be toxic to humans. It is naturally present in the sediment covering the bottoms of lakes and rivers, where it is absorbed by the plants, then by the animal population through the food chain. In other words, the mercury travels through the plants in which it is present, to the little fish that eat them, which in turn are eaten by bigger fish. The mercury is difficult to eliminate, and is found in increasing concentrations as you go up the food chain (referred to as bioaccumulation). The mercury eventually ends up in the fish caught, cooked, and eaten by humans, where it is absorbed by them.

Too much mercury in the human body can cause degeneration of the nervous system. This poisoning is called, among other things, "Miamata sickness" from the name of a Japanese village where a large number of people were poisoned by mercury as a result of industrial waste.

It is believed that the mercury in the waters of Northern Quebec comes from various sources. In the southern part of the territory, certain pulp and paper mills using the chlorine-alkali bleaching method are dumping mercury-contaminated waste into the water. However, the mercury mostly comes from the soil itself. It is naturally present, but its concentration can suddenly increase if the sediment, coming from areas deforested by intensive tree-cutting, is washed by the rainwater into the neighbouring lakes and rivers. The land flooded by the construction of hydroelectric dams also releases mercury.

It goes without saying that the news had the effect of a bomb on Maurice's community, where fish has been part of the daily diet since time immemorial. This discovery raised a whole range of questions, some of which were very worrisome to Maurice's parents. What should they do about this danger? Should they stop fishing to protect Maurice's health and that of his brothers and sisters? And if so, what would become of their traditional way of life?

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APPENDICES

APPENDIX A: WORLD SCIENTISTS' WARNING TO HUMANITY

Human beings and the natural world are on a collision course. Human activities inflict harsh and often irreversible damage on the environment and on critical resources. If not checked, many of our current practices put at serious risk the future that we wish for human society and the plant and animal kingdoms, and may so alter the living world that it will be unable to sustain life in the manner that we know. Fundamental changes are urgent if we are to avoid the collision our present course will bring about.

The Environment

The environment is suffering critical stress.

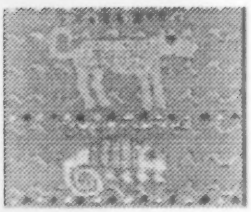
The Atmosphere: Stratospheric ozone depletion threatens us with enhanced ultraviolet radiation at the Earth's surface, which can be damaging or lethal to many life forms. Air pollution near ground level, and acid precipitation, are already causing widespread injury to humans, forests, and crops.

Water Resources: Heedless exploitation of depletable groundwater supplies endangers food production and other essential human systems. Heavy demands on the world's surface waters have resulted in serious shortages in some 80 countries, containing 40 percent of the world's population. Pollution of rivers, lakes, and groundwater further limits the supply.

Oceans: Destructive pressure on the oceans is severe, particularly in the coastal regions which produce most of the world's food fish. The total marine catch is now at or above the estimated maximum sustainable yield. Some fisheries have already shown signs of collapse. Rivers carrying heavy burdens of eroded soil into the seas also carry industrial, municipal, agricultural, and livestock waste — some of it toxic.

Soil: Loss of soil productivity, which is causing extensive land abandonment, is a widespread by-product of current practices in agriculture and animal husbandry. Since 1945, 11 percent of the Earth's vegetated surface has been degraded — an area larger than India and China combined — and per capita food production in many parts of the world is decreasing.

Forests: Tropical rain forests, as well as tropical and temperate dry forests, are being destroyed rapidly. At present rates, some critical forest types will be gone in a few years and most of the tropical rain forest will be gone before the end of the next century. With them will go large numbers of plant and animal species.



Living Species: The irreversible loss of species, which by 2100 may reach one third of all species now living, is especially serious. We are losing the potential they hold for providing medicinal and other benefits, and the contribution that genetic diversity of life forms gives to the robustness of the world's biological systems and to the astonishing beauty of the Earth itself.

Much of this damage is irreversible on a scale of centuries or permanent. Other processes appear to pose additional threats. Increasing levels of gases in the atmosphere from human activities, including carbon dioxide released from fossil fuel burning and from deforestation, may alter climate on a global scale. Predictions of global warming are still uncertain — with projected effects ranging from tolerable to very severe — but the potential risks are very great.

Our massive tampering with the world's interdependent web of life — coupled with the environmental damage inflicted by deforestation, species loss, and climate change — could trigger widespread adverse effects, including unpredictable collapses of critical biological systems whose interactions and dynamics we only imperfectly understand.

Uncertainty over the extent of these effects cannot excuse complacency or delay in facing the threat.

Population

The Earth is finite. Its ability to absorb wastes and destructive effluent is finite. Its ability to provide food and energy is finite. Its ability to provide for growing numbers of people is finite. And we are fast approaching many of the Earth's limits. Current economic practices which damage the environment, in both developed and underdeveloped nations, cannot be continued without the risk that vital global systems will be damaged beyond repair.

Pressures resulting from unrestrained population growth put demands on the natural world that can overwhelm any efforts to achieve a sustainable future. If we are to halt the destruction of our environment, we must accept limits to that growth. A World Bank estimate indicates that world population will not stabilize at less than 12.4 billion, while the United Nations concludes that the eventual total could reach 14 billion, a near tripling of today's 5.4 billion[8]. But, even at this moment, one person in five lives in absolute poverty without enough to eat, and one in ten suffers serious malnutrition.

No more than one or a few decades remain before the chance to avert the threats we now confront will be lost and the prospects for humanity immeasurably diminished.

The Union of Concerned Scientists issued the following warning to alert humanity to a global crisis that they foresee occurring if issues of sustainability are not addressed comprehensively. The Union makes several suggestions pertaining to what individuals can do to contribute to a sustainable future.

This warning is included as a basis for discussion, debate, and evaluation of sustainability issues, not necessarily as an indication of the philosophy of Manitoba Education and Training.

[8] This is a 1992 statistic. 1999 statistics place the world population at 6 billion.

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WARNING FROM THE UNION OF CONCERNED SCIENTISTS

We the undersigned, senior members of the world's scientific community, hereby warn all humanity of what lies ahead. A great change in our stewardship of the Earth and the life on it is required if vast human misery is to be avoided and our global home on this planet is not to be irretrievably mutilated.

What We Must Do

Five inextricably linked areas must be addressed simultaneously:

1. *We must bring environmentally damaging activities under control to restore and protect the integrity of the Earth's systems upon which we depend. We must, for example, move away from fossil fuels to more benign, inexhaustible energy sources to cut greenhouse gas emissions and the pollution of our air and water. Priority must be given to the development of energy sources matched to developing nations' needs — small of scale and relatively easy to implement. We must halt deforestation, injury to and loss of agricultural land, and the loss of terrestrial and marine plant and animal species.*
2. *We must manage resources that are crucial to human welfare more effectively.*

   We must give high priority to efficient use of energy, water, and other materials, including expansion of conservation and recycling.
3. *We must stabilize population. This will be possible only if all nations recognize that it requires improved social and economic conditions, and the adoption of effective, voluntary family planning.*
4. *We must reduce and eventually eliminate poverty.*
5. *We must ensure sexual equality, and guarantee women control over their own reproductive decisions.*

The developed nations are the largest polluters in the world today. They must greatly reduce their overconsumption before pressures on resources and the global environment can ever be alleviated. The developed nations have an obligation to provide aid and support to developing nations, because only the developed nations have the financial resources and the technical skills for these tasks.

Acting on this recognition is not altruism, but enlightened self-interest: whether industrialized or not, we all have but one lifeboat. No nation can escape from injury when global biological systems are damaged. No nation can escape from conflicts over increasingly scarce resources. In addition, environmental and economic instabilities will cause mass migrations with incalculable consequences for developed and undeveloped nations alike.

WARNING FROM THE UNION OF CONCERNED SCIENTISTS (CONTINUED)

Success in this global endeavour will require a great reduction in violence and war. Resources now devoted to the preparation and conduct of war — amounting to over $1 trillion annually — will be badly needed in the tasks ahead and should be diverted to the new challenges.

A new ethic is required, a new attitude towards fulfilling our responsibility for caring for ourselves and for the Earth. We must recognize the Earth's limited capacity to provide for us. We must recognize its fragility. We must no longer allow it to be ravaged. This ethic must motivate a great movement, convince reluctant leaders and reluctant governments and reluctant peoples themselves to effect the needed changes.

The scientists issuing this warning hope that this message will reach and affect people everywhere. We need the help of many.

- *We require the help of the world community of scientists — natural, social, economic, and political*
- *We require the help of the world's business and industrial leaders*
- *We require the help of the world's religious leaders*
- *We require the help of the world's peoples*

We call on all to join us in this task. Over 1500 members of national, regional, and international science academies have signed the Warning. Sixty-nine nations from all parts of the Earth are represented, including each of the 12 most populous nations and the 19 largest economic powers. The full list includes a majority of the Nobel laureates in the sciences. Awards and institutional affiliations are listed for the purpose of identification only. The Nobel Prize in medicine is for physiology or medicine.

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Warning issued on November 18, 1992

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APPENDIX B: ABORIGINAL PERSPECTIVES

Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and fully support their identity, culture and interests, and enable their effective participation in the achievement of sustainable development.

(The United Nations Conference on Environment and Development 1992, 1992)

Traditionally, Aboriginal people have exemplified the qualities of good stewardship in their interactions with the environment.

Aboriginal environmental knowledge developed over centuries of observing and understanding seasonal changes — changes that were taken into consideration as a natural part of daily life and decision making.

Decisions were made with regard for the environment, which ultimately met the needs of individuals, families, and communities.

As food gatherers, Aboriginal people moved to areas where the land was bountiful. Each of the four seasons had a special time to hunt and trap animals for food and clothing, a time to catch fish, to harvest fruit and berries, and a time to pick and prepare medicines and roots.

In conducting these activities, Aboriginal people considered the growth, reproduction, and regeneration cycles of plants, animals, and birds. To interrupt these natural cycles and patterns was considered to be an act against the laws of nature. This knowledge and understanding of the natural environment reflected the importance of sustaining Mother Earth for seven generations to come.

It is necessary for all peoples to embrace the concept of survival of the seventh generation, which is truly the heart of sustainability.

We must make decisions that ensure an equitable quality of life for all for seven generations to come.

Embedded within the Aboriginal world view is the concept of collective responsibility for tending the land and using only that which is needed for sustenance. Important, as well, is the interconnectedness and interdependence of all life forms — humankind, flora and fauna, and all that exists on the Earth. The concept of sustainability is not new to Aboriginal people; they are very aware of the growing need for all humans to show greater respect for the environment — respect for Mother Earth — if we are to continue to coexist in this world.

Many Aboriginal people currently embrace sustainability beliefs through their traditional practices. This is evident in the richness and vastness of Aboriginal cultural practices, in particular, the many feasts and celebrations that are held to give thanks for life. There is a celebration and acknowledgement for each season and, as in the past, there is a special time to say "thank you" to the Creator for all life.

Given that the Aboriginal population is one of the fastest growing segments in Manitoba, it is critically important that these beliefs and practices are maintained and passed on to new generations. However, in a world where sustainability has not been the norm, the challenge of this approach can be difficult. Aboriginal people face a double challenge — to maintain their traditional sustainability practices and to achieve equity in a fast-changing world.

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Aboriginal beliefs and practices have also received global recognition, as evidenced in Principle 22 of the Earth Charter. This recognition provides a sense of hope and rekindles Aboriginal people's collective and social responsibility for the future — a responsibility that must be shared equally among all people.

Aboriginal people are rich in environmental knowledge and can provide important perspectives when considering the impact of economic decisions on the environment.

Aboriginal people are also a source of sustainability strategies that can contribute to our collective well-being. Through ongoing communication and an understanding of traditional and environmental knowledge, education for a sustainable future can be achieved.

Aboriginal perspectives, with respect to traditional environmental knowledge as well as sustainability concepts, can be integrated into curricula in order to help teachers and students understand the importance of an education towards a sustainable society.

The chart that follows illustrates key Aboriginal sustainability concepts.

Aboriginal Sustainability Concepts

Mother Earth as a Life-Giving Force	In many Aboriginal languages, "Mother Earth" is depicted as a living person. If the inhabitants of this world continue to desecrate her, then she will no longer be a life-giving force.
Laws of Nature	There was a time and season for all life-sustaining activities. Animals were not killed during their reproductive cycles.
Life-Sustaining Elements of the World	**Air:** the essential element of human and all life forms. It also is the means by which one thinks and speaks. **Earth:** provides food and many other life-sustaining materials and resources. **Fire:** provides heat and light. The Sun is fire. **Water:** cools and nurtures, makes life and growth possible. Balance among the four basic elements, the innate capacities of humankind, and the life-sustaining elements of nature makes it possible to live well and comfortably.
Interrelationships and Interconnectedness	Take no person, animal, or thing for granted. Everyone and everything has a role and a place.

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APPENDIX C: HISTORICAL OVERVIEW OF SUSTAINABLE DEVELOPMENT

1915

Canada's Commission on Conservation declares our need to live within the world's means. The Commission supports the notion that each generation is entitled to the interest on the natural capital, but the principal should be handed down unimpaired.

pre-1970

Ecological authors, including John Muir, Grey Owl, Ernest Thompson Seton, Aldo Leopold, and Rachel Carson discussed issues of sustainability. Their concerns stem from the exponential growth of the human population and the load placed on the natural environment. Many authors and scientists during this time period argue that the world has finite resources and capacity to absorb the ecological burdens created by humans. As a solution to the population problem, many propose that developed countries embark on a process of "de-development," and that underdeveloped countries pursue a different type of development. To create a better balance of equity between developed and underdeveloped countries, some authors suggest that developed countries should share their wealth and resources with developing countries.

1972
The Stockholm Declaration

Delegates from 113 countries attend the United Nations Stockholm Conference on the human environment entitled "Only One Earth." They discuss environmental problems such as acid rain and pollution. This gathering of nations results in **The Stockholm Declaration and Action Plan**. The Action Plan highlights 109 recommendations for action in areas of conservation of natural resources, education, human settlements, and pollution at both the national and international levels. The Stockholm meeting results in the creation of the United Nations Environment Program (UNEP). Several United Nations Conferences focussing on themes such as water, climate, science and technology, air and water pollution, and women occur between 1974 and 1981.

1983
World Commission on the Environment and the Economy

The United Nations General Assembly appoints an independent commission to study the critical environmental issues that have arisen as a consequence of development. The intent of this Commission is to generate solutions that would effectively address these issues. This Commission is known as the **World Commission on Environment and Development** and is chaired by Prime Minister Gro Harlem Brundtland of Norway.

The specific mandate of the Commission (1987) was:

1. To re-examine the critical issues of environment and development and to formulate innovative, concrete and realistic action proposals to deal with them;

2. To strengthen international co-operation on environment and development and to assess and propose new forms of co-operation that can break out of existing patterns and influence policies and events in the direction of needed change; and
3. To raise the level of understanding and commitment to action on the part of individuals, voluntary organizations, businesses, institutes and governments (p. 356).

1987 Brundtland Commission

From 1983 to 1987, the Commission (also known as the Brundtland Commission) undertakes research and conducts public hearings to explore global solutions to problems caused by environmental degradation. The Commission is confident that "*it is possible to build a future that is more prosperous, more just, and more secure.*" The Commission report, ***Our Common Future***, is presented to the UN General Assembly in 1987 and concludes that the world is facing a serious threat brought on by unsustainable development. This report, also known as the Brundtland Report, captures the world's attention. (The report continues to have influence today.) The Report emphasizes the links among problems of growth, technology, environment and economics and offers as a solution the concept of **sustainable development**, that it defines as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (WCED, 1987, p. 8). Central ideas in the report include sustainability as a condition that the global human population should strive toward, and development as the process of change required to attain sustainability.

1991 Learning for a Sustainable Future

Recognizing the important role of formal education systems in furthering sustainable development, the National Round Table on the Environment and the Economy creates the non-profit organization, **Learning for a Sustainable Future** (LSF) in 1991. LSF works with educators across Canada to integrate the concepts and principles of sustainable development into the curricula at all grade levels.

1992 World Conference on Environment and Development (Earth Summit)

The United Nations votes to hold a **World Conference on Environment and Development** (Earth Summit) in Rio de Janeiro. Representatives from 178 countries, and 117 heads of state meet to discuss the relationship between the environment and the economy. The Conference delegates adopt the Earth Charter (follows at the end of this section).

The Conference results in the production of an 800-page report entitled *Agenda 21* which discusses future sustainable development initiatives.

One of the key reference points for the advancement of a sustainable future through education has been Chapter 36 of *Agenda 21* (Rio de Janeiro, 1992). This chapter is titled "Promoting education, public awareness and training," and has been adopted and approved by 178 countries.

Education is the basis for action:

Education (including formal education, public awareness and training) should be recognized as a process by which human beings and societies can reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. While basic education provides the underpinning for any environmental and development education, the latter needs to be incorporated as an essential part of learning. Both formal and non-formal education are indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviours consistent with sustainable development and for effective public participation in decision-making. To be effective, environment and development education should deal with the dynamics of both the physical/biological and socio-economic environment and human (which may include spiritual) development, should be integrated into all disciplines, and should employ formal and non-formal methods and effective means of communication.

36.5 (b) Governments should strive to update or prepare strategies aimed at integrating environment and development as a cross-cutting issue into education at all levels within the next three years. This should be done in cooperation with all sectors of society. The strategies should set out policies and activities, and identify needs, cost, means and schedules for the implementation, evaluation, and review. A thorough review of curricula should be undertaken to ensure a multidisciplinary approach, with environment and development issues and their socio-cultural and demographic aspects and linkages. Due respect should be given to community-defined needs and diverse knowledge systems, including science, cultural, and social sensitivities.

(c) Countries are encouraged to set up national advisory environmental education coordinating bodies or round tables representative of various environmental, developmental, educational, gender and other interests, including non-governmental organizations, to encourage partnerships, help mobilize resources, and provide a source of information and focal point for international ties. These bodies would help mobilize and facilitate different population groups and communities to assess their own needs and to develop the necessary skills to create and implement their own environment and development initiatives.

1996 The United Nations Commission on Sustainable Development (CSD)

Sustainable Development Education and Awareness Workshop in Prague, Czech Republic.

Mandated to ensure the follow-up of *Agenda 21*, in April 1996, the 52 member countries of the United Nations Commission on Sustainable Development recommend:

1) the development of an international strategic alliance among UNESCO, UNEP, the World Bank, UNDP, UNICEF, WHO, and international NGOs such as WWF, IUCN, and others.

2) the development and implementation of a work plan

At its Fourth Session in April 1996, the Commission on Sustainable Development (CSD) recommends that a Work Programme be developed with the following objectives:

- Develop a broad international alliance, taking into account past experience and promoting networks in partnership with UNEP, IUCN, and other key institutions.
- advise on how education and training for sustainable development can be integrated into national educational policies.
- advance education and training for sustainable development for educators at the national level.
- refine the concept and key messages for sustainable development.
- provide financial and technical support.

1996

The Seventh Conference of the Ministers of Education of Latin America and the Caribbean, Kingston, Jamaica (May 1996)

The mid-decade Meeting of the International Consultative Forum on Education for All, Amman, Jordan (June, 1996)

The International Conference on Education, 45th Session, Geneva, Switzerland (September–October 1996)

The Summit of the Americas on Sustainable Development, Santa Cruz de la Sierra, Bolivia (December 1996)

In the United States, the President's Council on Sustainable Development has developed a national strategy for Sustainable Development Education entitled "Sustainable America: A New Consensus for the Prosperity, Opportunity and a Healthy Environment for the Future." (1996)

1997
The Extraordinary Session of the UN General Assembly (June 1997)

In preparation for the Extraordinary Session of the United Nations General Assembly (June 1997), which looked at progress since the Earth Summit, the CSD recommends that:

- Chapter 36 be considered a cross-sectoral chapter of *Agenda 21*. Since 1992, this chapter has continued to enjoy unanimous support from governments, major groups and the educational community of both developed and developing countries, as it had in Rio. Education is considered indispensable for sustainable development and for increasing the capacity of people to address environment and development issues. The implementation of Chapter 36 is, therefore, seen to influence progress in the implementation of all the other chapters of *Agenda 21*.
- Recommendations concerning education also appear in each of the action plans of the major United Nations conferences held after the United Nations Conference on Environment and Development as well as in the three conventions (on biodiversity, climate change, and diversification). For this reason, education can be seen as the cornerstone of sustainable development in all its dimensions.

As demonstrated at the Extraordinary Session, many countries have already made the initial steps necessary to reorient education toward sustainable development.

Paragraph 105 of the Final Declaration endorsed by all countries states:

Even in countries with strong education systems, there is a need to reorient education, awareness and training to increase widespread public understanding, critical analysis and support for sustainable development. Education for a sustainable future should engage a wide spectrum of institutions and sectors, including but not limited to business /industry, international organizations, higher education, government, educators and foundations, to address the concepts and issues of sustainable development, as embodied throughout Agenda 21, and should include the preparation of sustainable development education plans and programmes, as emphasized in the Commission's work programme on the subject adopted in 1996. The concept of education for a sustainable future will be further developed by UNESCO, in cooperation with others.

1997 The International Conference on Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action, organized by UNESCO and the Government of Greece, Thessaloniki, Greece, December 1997.

1997 In addition, the Task Force developed numerous publications, including:

From Classroom to Community and Beyond: Educating for a Sustainable Future. Report of the Public Linkage, Dialogue, and Education Task Force of the President's Council on Sustainable Development. February 1997

1998 At the First meeting of the Ministers of Education of the Americas (July 20-21, 1998) The *Inter-American Education Program* was approved and a resolution was adopted to put forward the project of *Education for Citizenship and Sustainability in Multicultural Societies*, and for that purpose, the ministers recommended the coordination of the efforts of other organizations with similar experiences.

1999 The Council of Ministers of Education of Canada (CMEC) published *Educating for Sustainability: The Status of Sustainable Development Education in Canada*. The report was developed to provide

- a historical review of sustainable development/sustainability and to provide a rationale for educating for sustainability.
- a current and comprehensive view of the progress that has occurred across Canada related to sustainable development education including a review of education and training policies, guidelines, curricula (K-12 and post-secondary), teacher education, professional development, materials/resources, educational models, educational priorities and other innovative practices as they relate to educating for sustainability.
- an appropriate context for continuing dialogue and to identify a relevant framework for desired future action.

Jurisdictions contributing to the preparation of *Educating for Sustainability: The Status of Sustainable Development Education in Canada* included Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Northwest Territories, Nova Scotia, Nunavut, Ontario, Prince Edward Island, Quebec, Saskatchewan, and Yukon.

The concept of sustainability has also been adopted by educators across Canada, and reinforced by the endorsement of stakeholders from all sectors of society, including government, business, labour, and parent groups.

Sustainability has also been incorporated into new curriculum guidelines. For example, the *Pan-Canadian Framework for Science Learning Outcomes, and Science, Technology, Society, and Environment (STSE)* reflects this perspective, as does the Science foundation document of the Common Curriculum developed by the Atlantic provinces.

Adapted from CMEC, *The Status of Sustainable Development Education in Canada*, 1999, p. 6.

APPENDIX D: THE SUSTAINABLE DEVELOPMENT AND CONSEQUENTIAL AMENDMENTS ACT

The *Sustainable Development Act* was proclaimed on July 1, 1998.

The Act contains important requirements which government departments, agencies, and Crown corporations are required to comply with. The Act is divided into eight parts:

Part 1. Definition and Purpose

The purpose of the Act is to create a framework through which sustainable development will be implemented in the provincial public sector and promoted in private industry and in society generally.

Part 2. Framework for Implementing SD

Part 2 of the Act establishes a framework for implementing sustainable development in terms of the development of new legislation, in reviewing and revising existing legislation and policies, and in the development of reporting requirements for departments, Crown corporations, and provincial public sector organization.

Part 3. Principles and Guidelines

Part 3 of the Act identifies sustainable development principles and guidelines (Please refer to Appendix E).

Part 4. SD Strategies

Within two years of July 1, 1998, a Sustainable Development Strategy for Manitoba must be established.

A sustainable development strategy was developed in 1991, and is now being revised to meet this obligation.

The provincial strategy is intended to establish provincial sustainable development goals, to establish a framework for sustainable development policy development, and to guide the preparation of specific economic, environmental, resources, and human health and social policy component strategies.

Strategies are strategic plans for achieving sustainability in specific sectors and are usually developed as follows:

1. Workbook and/or concept paper
2. What you told us document
3. Policy Application Report
4. Implementation Plan

Part 5. Provincial Sustainability Indicators and Reporting

Within three years of July 1, 1998, sustainability indicators are to be established. A provincial Sustainability Report shall be established and will include a government-wide procurement progress report which evaluates and reports on each department's progress.

Part 6. Public Sector Operations

Part 6 of the Act is related to Public Sector Operations and includes the development of the following: a code of practice, financial management guidelines, procurement guidelines, and guidelines for local authorities and others.

Code of Practice: Within three years of July 1, 1998, a provincial sustainable development Code of Practice will be established. A Working Group is currently ensuring that this obligation is met. Working group members have knowledge of departmental business planning and priority-setting procedure, as well as management and decision-making processes and industry or stakeholder voluntary compliance codes.

Financial Management: Within three years of July 1, 1998, Financial Management Guidelines must be established (for evaluating the sustainability of activities and programs). Guidelines should then be integrated into provincial management manuals and procedures.

Procurement Guidelines: Within two years of July 1, 1998, Sustainable Development Procurement Guidelines must be established and those guidelines should then be integrated into provincial procurement manuals and procedures.

Guidelines for Local Authorities and Others: Within five years after July 1, 1998, local authorities, school divisions, universities, colleges, regional health authorities must adopt both the financial management guidelines and the procurement guideline and they then have to be integrated into the financial management and procurement manuals and procedures of those local authorities, school divisions, universities, colleges, regional health authorities and hospitals. A Working Group is currently ensuring that this obligation is being met. Working group members have knowledge and personal working relationships and familiarity with the structures of stakeholder organizations of those groups identified in Section 15 of the Act.

Part 7. Sustainable Development Innovation Fund (SDIF)

The SDIF provides funding for the development, implementation, and promotion of environmental innovation and sustainable development projects. The SDIF is targeted at the sustainability of Manitoba's environment, economy, human health, and social well-being and supportive of environmentally sustainable economic growth.

The Sustainable Development and Consequential Amendments Act: A copy of the Act is available at Manitoba Statutory Publications, Lower Level, 200 Vaughan Street, Winnipeg, Manitoba R3C 1T5

The Objectives of the SDIF is:

- to support and promote environmental and sustainable industry innovation.
- to encourage educated decisions and actions regarding sound environmental and sustainable development practices.
- to promote research and demonstration of new initiatives not addressed by existing programs.
- to stimulate economic development and diversification to improve the quality of life, and to strengthen community identity, in support of the various geographical regions and ethnic groups in Manitoba, including Aboriginal peoples.
- to demonstrate sustainable environmental approaches to prevent waste and pollution, and to conserve resources.
- to support local practices of global importance and benefit to all Manitobans through a healthy environment and a diversified economy, for today and future generations.

SDIF Priority areas include: regional waste management; environmental technology innovation and demonstration; northern environmental issues; sustainable community development; sustainable agricultural practices; ecosystem conservation; understanding our environment; eco-tourism; and water.

Eligible applicants include: municipalities; local governments, including Community Councils and First Nation Communities; private and non-profit organizations; youth groups and community associations; educational institutions; and industrial, commercial, institutional organizations.

Funding Limits: A project-funding cap of $50,000 has been set, however, projects that require funding in excess of this amount may be considered. The SDIF will normally support one-time-only grants.

Proposals will be considered up to four times annually. Application deadlines for fiscal year 2000/2001 are: June 1, September 1, and January 1. Funding decisions and grant awards will be made three times until March 31, 2001, August, October, and February.

For more information concerning the SDIF, contact: Manitoba Conservation, Pollution Prevention Branch; 123 Main Street, Suite 160; Winnipeg, Manitoba; R3C 1A5.

Part 8. General Provisions

Part 8 of the Act deals with regulations, legislation reviews, ensuring that the Crown and agents of the Crown are bound by the Act.

APPENDIX E: MANITOBA'S PRINCIPLES AND FUNDAMENTAL GUIDELINES OF SUSTAINABLE DEVELOPMENT

Principles

Integration of Environmental and Economic Decisions

Economic decisions should adequately reflect environmental, human health, and social effects.

Environmental and health initiatives should adequately take into account economic, human health, and social consequences.

Stewardship

The economy, the environment, human health, and social well-being should be managed for the equal benefit of present and future generations.

Manitobans are caretakers of the economy, the environment, human health, and social well-being for the benefit of present and future generations.

Today's decisions are to be balanced with tomorrow's effects.

Shared Responsibility and Understanding

Manitobans should acknowledge responsibility for sustaining the economy, the environment, human health, and social well-being, with each being accountable for decisions and actions in a spirit of partnership and open cooperation.

Manitobans share a common economic, physical, and social environment.

Manitobans should understand and respect differing economic and social views, values, traditions, and aspirations.

Manitobans should consider the aspirations, needs, and views of the people of the various geographical regions and ethnic groups in Manitoba, including aboriginal peoples, to facilitate equitable management of Manitoba's common resources.

Prevention

Manitobans should anticipate, and prevent or mitigate, significant adverse economic, environmental, human health and social effects of decisions and actions, having particular careful regard to decisions whose impacts are not entirely certain but which, on reasonable and well-informed grounds, appear to pose serious threats to the economy, the environment, human health, and social well-being.

Conservation and Enhancement

Manitoba should:

a) maintain the ecological processes, biological diversity, and life-support systems of the environment;

b) harvest renewable resources on a sustainable yield basis;

c) make wise and efficient use of renewable and non-renewable resources; and

d) enhance the long-term productive capability, quality and capacity of natural ecosystems.

Rehabilitation and Reclamation

Manitoba should:

a) endeavour to repair damage to or degradation of the environment; and

b) consider the need for rehabilitation and reclamation in future decisions and actions.

Guidelines

Efficient Use of Resources

which means

a) encouraging and facilitating development and application of systems for proper resource pricing, demand management, and resource allocation together with incentives to encourage efficient use of resources; and

b) employing full-cost accounting to provide better information for decision-makers.

Public Participation

which means

a) establishing forums which encourage and provide opportunity for consultation and meaningful participation in decision making processes by Manitobans;

b) endeavouring to provide due process, prior notification, and appropriate and timely redress for those adversely affected by decisions and actions; and

c) striving to achieve consensus among citizens with regard to decisions affecting them.

Access to Information

which means

a) encouraging and facilitating the improvement and refinement of economic, environmental, human health, and social information; and

b) promoting the opportunity for equal and timely access to information by all Manitobans.

Integrated Decision Making and Planning

which means

encouraging and facilitating decision making and planning processes that are efficient, timely, accountable, and cross-sectoral and which incorporate an inter-generational perspective of future needs and consequences.

Waste Minimization and Substitution

which means

a) encouraging and promoting the development and use of substitutes for scarce resources where such substitutes are both environmentally sound and economically viable, and

b) reducing, reusing, recycling, and recovering the products of society.

Research and Innovation

which means

encouraging and assisting the researching, development, application, and sharing of knowledge and technologies which further our economic, environmental, human health, and social well-being.

Manitoba's Principles and Fundamental Guidelines of Sustainable Development are included in *The Sustainable Development and Consequential Amendments Act.* A copy of the Act is available at Manitoba Statutory Publications, Lower Level, 200 Vaughan Street, Winnipeg, Manitoba R3C 1T5

APPENDIX F: LEARNING FOR A SUSTAINABLE FUTURE: KNOWLEDGE, SKILLS, ATTITUDES, AND VALUES

Recognizing the critical role of curriculum in the teaching of sustainability concepts, Learning for a Sustainable Future (LSF), a national, non-profit organization, has developed a framework to help guide the teaching of sustainable development. The intent of the document is to support the integration of sustainability principles into provincial and territorial education policies, schools, curricula, teacher training, and professional development. Approximately 800 Canadian educators, government and non-governmental organizations, business leaders, and other stakeholders were consulted during the development of the framework, which identifies a comprehensive list of sustainability knowledge, skills, and values.

The LSF framework is an important document, as it represents a consensus among Canadian educators regarding sustainability education. The sustainability knowledge, skills, and attitudes, as defined by LSF follow.

Knowledge Needed:

- The planet Earth as a finite system and the elements that constitute the planetary environment.
- The resources of the Earth, particularly soil, water, minerals, etc., and their distribution and role in supporting living organisms.
- The nature of ecosystems and biomes, their health, and their interdependence within the biosphere.
- The dependence of humans on the environmental resources for life and sustenance.
- The sustainable relationship of native societies to the environment.
- The implications of resource distribution in determining the nature of societies and the rate and character of economic development.
- Characteristics of the development of human societies including nomadic, hunter-gatherer, agricultural, industrial, and post-industrial, and the impact of each on the natural environment.
- The role of science and technology in the development of societies and the impact of these technologies on the environment.
- Philosophies and patterns of economic activity and their different impacts on the environment, societies, and cultures.
- The process of urbanization and the implications of de-ruralization.
- The interconnectedness of present-world political, economic, environmental, and social issues.
- Aspects of differing perspectives and philosophies concerning the ecological and human environments.

- Cooperative international and national efforts to find solutions to common global issues, and to implement strategies for a more sustainable future.
- The implications for the global community of the political, economic, and socio-cultural changes needed for a more sustainable future.
- Processes of planning, policy making, and action for sustainability by governments, businesses, non-governmental organizations, and the general public.

Skills Needed:

- Frame appropriate questions to guide relevant study and research.
- Define such fundamental concepts as environment, community, development, and technology, and apply definitions to local, national, and global experience.
- Use a range of resources and technologies in addressing questions.
- Assess the nature of bias and evaluate different points of view.
- Develop hypotheses based on balanced information, critical analysis, and careful synthesis, and test them against new information and personal experience and beliefs.
- Communicate information and viewpoints effectively.
- Work towards negotiated consensus and cooperative resolution of conflict.
- Develop cooperative strategies for appropriate action to change present relationships between ecological preservation and economic development.

Attitudes and Values Needed:

- Appreciation of the resilience, fragility, and beauty of nature and the interdependence and equal importance of all life forms.
- Appreciation of the dependence of human life on the resources of a finite planet.
- Appreciation of the role of human ingenuity and individual creativity in ensuring survival and the search for appropriate and sustainable progress.
- Appreciation of the power of human beings to modify the environment.
- A sense of self-worth and rootedness in one's own culture and community.
- Respect for other cultures and a recognition of the interdependence of the human community.
- A global perspective and loyalty to the world community.
- Concern for disparities and injustices, a commitment to human rights and to the peaceful resolution of conflict.
- Appreciation of the challenges faced by the human community in defining the processes needed for sustainability and in implementing the changes needed.
- A sense of balance in deciding among conflicting priorities.
- Personal acceptance of a sustainable lifestyle and a commitment to participation in change.

- A realistic appreciation of the urgency of the challenges facing the global community and the complexities that demand long-term planning for building a sustainable future.
- A sense of hope and a positive personal and social perspective on the future.
- Appreciation of the importance and worth of individual responsibility and action.

Learning for a Sustainable Future: Knowledge, Skills, Attitudes, and Values: Ottawa, ON: Learning for a Sustainable Future. Online posting. 1993. Date of access: 24 08 2000. <http://www.schoolnet.ca/future/teacher/concepts/content.htm>

APPENDIX G: EARTH CHARTER

The historic United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992, adopted the following Earth Charter:

PRINCIPLE 1 Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

PRINCIPLE 2 States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdictions or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

PRINCIPLE 3 The right to develop must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

PRINCIPLE 4 In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

PRINCIPLE 5 All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.

PRINCIPLE 6 The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.

PRINCIPLE 7 States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

PRINCIPLE 8	To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.
PRINCIPLE 9	States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.
PRINCIPLE 10	Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.
PRINCIPLE 11	States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. Standards applied by some countries may be inappropriate and have unwarranted economic and social cost to other countries, in particular developing countries.
PRINCIPLE 12	States should cooperate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.
PRINCIPLE 13	States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

PRINCIPLE 14	States should effectively cooperate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.
PRINCIPLE 15	In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.
PRINCIPLE 16	National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.
PRINCIPLE 17	Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.
PRINCIPLE 18	States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.
PRINCIPLE 19	States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.
PRINCIPLE 20	Women have a vital role in environmental management and development. Their full participation is, therefore, essential to achieve sustainable development.
PRINCIPLE 21	The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.
PRINCIPLE 22	Indigenous people and their communities, and other local communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and fully support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.
PRINCIPLE 23	The environment and natural resources of people under oppression, domination and occupation shall be protected.

PRINCIPLE 24	Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.
PRINCIPLE 25	Peace, development and environmental protection are interdependent and indivisible.
PRINCIPLE 26	States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.
PRINCIPLE 27	States and people shall cooperate in good faith and in a spirit of partnership in the fulfillment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.

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